OCS-A 0501 MASS USA

VINEYARD WIND

Supplement to the Outer Continental Shelf Air Permit Application - Operating Permit Application

Vineyard Wind Project

April 18, 2019

Submitted by
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Submitted to
United States Environmental Protection Agency Region 1
Region Headquarters
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Boston, Massachusetts 02114

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Epsilon ASSOCIATES INC.

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TABLE OF CONTENTS

List of Tables

1 INTRODUCTION

On behalf of Vineyard Wind, LLC ("Vineyard Wind" or "the Applicant"), Epsilon Associates, Inc. ("Epsilon") is requesting that Vineyard Wind's Outer Continental Shelf Air Permit Application submitted to EPA on August 17, 2018 constitute an application for a combined permit to construct and operate under the Outer Continental Shelf (OCS) Air Regulations at title 40 Code of Federal Regulations (CFR) Part 55.

Vineyard Wind's OCS Air Permit Application for its ~800 megawatt (MW) wind energy project (the "Project") in the northern half of Lease Area OCS-A 0501 was prepared to fulfill the regulatory requirements of the United States Environmental Protection Agency's (EPA) OCS Air Regulations (40 CFR § 55), which incorporate by reference the Massachusetts Operating Permit and Compliance Program at 310 CMR 7.00, Appendix C. Based on the current projected estimate of emissions, the Project will be subject to 310 CMR 7.00, Appendix C because the Project's federal potential emissions exceed 50 ton per year (tpy) of nitrogen oxides (NOx) during the Project's operational period. However, this estimate is subject to refinement. The following supplemental document identifies how the OCS Air Permit Application fulfills the requirements of 310 CMR 7.00, Appendix C and further supplements that application.

2 DESCRIPTION OF FACILITY AND OPERATIONS

Vineyard Wind, LLC is proposing an ~800 MW offshore wind project (the "Project") for the northern half of Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0501, located on the Outer Continental Shelf (OCS). The Project will use offshore wind energy as its renewable fuel to generate electricity for sale. The Project consists of offshore Wind Turbine Generators (WTGs) (each placed on a foundation support structure), one or two Electrical Service Platforms (ESPs), an onshore substation, offshore and onshore transmission cabling, and onshore operations and maintenance (O&M) facilities. The Standard Industrial Code (SIC) for the Project is 4911. The North American Industry Classification System (NAICS) Code is 221115.

Section 2 of the OCS Air Permit Application provides a detailed description of the Project's facilities. Section 3 of the OCS Air Permit Application describes Project activities that will result in emissions subject to the Project's combined permit to construct and operate under the OCS Air Regulations. Specifically, Section 3.2 describes the Project's O&M activities subject to the Massachusetts operating permit program at 310 CMR 7.00, Appendix C.

Based on the current estimate of the Project's emissions, the Project will be subject to 310 CMR 7.00, Appendix C because the Project's federal potential emissions exceed 50 tpy of NOx during the Project's operational period (see Table 4.6-2 of the OCS Air Permit Application). However, this estimate is subject to refinement.

The Project's OCS sources are subject to New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) as described in Sections 5.1.1 and 5.1.2 of the OCS Air Permit Application, respectively. As described in Section 5.1.2 of the OCS Air Permit Application, the Project is a non-major source of hazardous air pollutants (HAPs) under 40 CFR Part 63 because its potential emissions are less than ten (10) tpy of any single HAP and less than 25 tpy of all HAPs combined (see Table 4.6-2 of the OCS Air Permit Application). Since the Project is not a major source of HAPs, it is an area source.

Applicable federal requirements are discussed in Section 5.1 of the OCS Air Permit Application. As described above, the OCS Air Permit Application constitutes a combined permit to construct and operate under the OCS Air Regulations at 40 CFR Part 55, which incorporate by reference the Prevention of Significant Deterioration of Air Quality (PSD) regulations at 40 CFR § 52.21.

Applicable Massachusetts requirements incorporated by reference into 40 CFR Part 55 are discussed in Section 5.2 of the OCS Air Permit Application. 310 CMR 7.71, Reporting of Greenhouse Gas Emissions, is not incorporated by reference into 40 CFR Part 55. Therefore, the Project is not subject to the requirements of Greenhouse Gas Emissions Reporting as defined by MassDEP in 310 CMR 7.71(3)(a).

Voluntary facility-wide emissions limits adopted based on the Project's Best Achievable Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) analysis are discussed in Section 7.2 of the OCS Air Permit Application. Vineyard Wind proposes facility-wide annual NOx and

volatile organic compound (VOC) emissions limits during O&M, which will be based on the Project's estimate of potential emissions. Vineyard Wind will monitor and record emissions to ensure the Project does not exceed these NOx and VOC limits.

The Compliance Assurance Monitoring (CAM) requirements at 40 CFR Part 64 apply when an emission unit uses a control device to comply with certain emission limits, the potential emissions before control are above major source thresholds, and the operating permit does not specify a continuous compliance determination method, such as a continuous emissions monitoring system (CEMS). Potential emissions from the Project's individual OCS sources are below major source thresholds; therefore, CAM requirements do not apply to the Project.

2.1 Facility Contact Information

Contact information for the Vineyard Wind Project is listed below.

Company Name:	Vineyard Wind, LLC
Company Mailing Address:	700 Pleasant Street, Suite 510 New Bedford, MA 02740
Facility Location:	Lease Area OCS-A 0501
Owner Name:	Vineyard Wind, LLC
Owner Telephone Number:	508-717-8964
Facility Site Contact:	Rachel Pachter
Contact Title:	V.P. Permitting Affairs
Contact Number:	508-717-8964
Contact E-mail Address:	rpachter@vineyardwind.com
Responsible Official Name:	Erich Stephens
Responsible Official Title:	Chief Development Officer
Responsible Official Number:	508-717-8964
Responsible Official E-mail Address:	estephens@vineyardwind.com

3 EMISSION UNIT IDENTIFICATION

During O&M, air emissions from the Project are primarily associated with fuel combustion and some incidental solvent use associated with the offshore operation and maintenance activities described Section 4.3.2 of the OCS Air Permit Application. There are four primary categories of sources for which the Project's potential emissions were calculated:

- Commercial marine vessels,
- Generators (backup power supply/emergency generators),
- Other non-road engines, and
- Fugitive emissions.

Section 4.1 of the OCS Air Permit Application describes the Project's OCS sources, which are defined as "any equipment, activity, or facility" that "(i) emits or has the potential to emit any air pollutant, (ii) is regulated or authorized under the Outer Continental Shelf Lands Act, and (iii) is located on the Outer Continental Shelf or in or on waters above the Outer Continental Shelf" (42 U.S.C. § 7627(a)(4)(C)). The definition of OCS source only includes vessels when they are "attached to the seabed and erected thereon" or physically attached to an OCS facility (40 CFR § 55.2).[1]

Section 4.3 of the OCS Air Permit Application describes the emission sources included in the Project's potential to emit (PTE). Specifically, Section 4.3.2 describes the Project's emission sources during the Project's operational period. The PTE calculations include vessels servicing or associated with OCS sources, as required by 40 CFR Part 55.

Emission estimates for the Project's operations and maintenance (O&M) phase are summarized in Table 4.6-2 of the OCS Air Permit Application. The methodology used to develop those estimates are described in Section 4.5 and Appendix B of the Application. Emission estimates are based on regulatory or permitted limits, engineering estimates, mass balances, or *AP-42* emission factors.

A more detailed preliminary emission inventory for all emission sources included in the Project's PTE can be found in Appendix B of the OCS Air Permit Application. It is important to note that the engine sizes and durations of activities used in the OCS Air Permit Application reflect most current Project design to the best of Vineyard Wind's knowledge at the time of submission, but because Vineyard Wind is still selecting contractors and finalizing the design its facilities, certain engine sizes and other Project details may change after the submission of this application. Vineyard Wind will not know exactly which third-party engines will be used until much closer to the start of O&M because operational and repair plans change on short notice and are highly weather-dependent, the market

[1] For vessels physically attached to an OCS facility, only the stationary sources aspects of the vessels are regulated as an OCS source.

demand for vessels is huge, and the Jones Act imposes limitations on available vessels. For these reasons, vessels may also be changed out after the operational period begins.

Consequently, the manufacturer, model number, maximum heat input rating, burner manufacturer, burner model number, number of burners, maximum fuel firing rate, and stack information for each emission unit is unknown and will not be known until shortly before O&M (and possibly during O&M). For the purposes of this operating permit application, OCS sources during O&M are grouped into general categories of emission units. The following emission units in Table 1 are subject to and regulated by the Operating Permit:

Table 1: Vineyard Wind Emission Unit Identification

EU	Description	Design Capacity	Pollution Control Device
1	Marine Compression-Ignition Engines on Jack-up Vessels/Crew and Supply Vessels that Become OCS Sources	Varies depending on the vessel selected.	N/A
2	Marine Compression-Ignition Engines on All Other Vessels that Become OCS Sources	Varies depending on the vessel selected.	N/A
3	Portable Emergency Diesel Generators on the WTGs (approx. 6 kW)	Varies depending on the generator selected.	N/A
4	Portable Emergency Diesel Generators on the WTGs (approx. 50 kW)	Varies depending on the generator selected.	Diesel Particulate Filter
5	Emergency Diesel Generators on the ESPs (approx. 400 kW)	Varies depending on the generator selected.	Diesel Particulate Filter
6	Non-Emergency, Temporary Diesel Engines on the ESPs (approx. 800 kW)	Varies depending on the generator selected.	N/A
7	Other Non-Emergency Diesel Engines on OCS Sources	Varies depending on the engine selected.	N/A

Table 1 Key:

ESP = Electrical Service Platform
EU = Emission Unit
kW = kilowatt
N/A = Not Applicable
OCS = Outer Continental Shelf
WTG = Wind Turbine Generator

Marine compression-ignition engines on jack-up vessels or crew and supply vessels that become OCS sources (EU 1) are distinguished from all other marine compression-ignition engines on OCS sources

(EU 2) due to different Lowest Achievable Emission Rate (LAER) requirements. To meet LAER, the Project's OCS sources must meet the most stringent emission limitation contained in any State Implementation Plan (SIP) or the most stringent emission limitation achieved in practice by such class or category of source (US EPA, 1990). California's Airborne Toxic Control Measure for Commercial Harbor Craft (17 CCR § 93118.5, excluding (e)(1)), which is included in California's SIP, requires marine engines in ferries, excursion vessels, tugboats, towboats, push boats, crew boats, supply vessels, barges, and dredge vessels to meet emission limits equal to or cleaner than Tier 2 U.S. EPA marine emission standards.

As described in Section 6.2.1.1 of the OCS Air Permit Application, "feeder" jack-up vessels used to transport WTG components from the construction staging area to the Wind Development Area meet the definition of "crew and supply vessel" as defined in CCR § 93118.5(d). Therefore, these jack-up vessels would be required under California's SIP to have engines meeting Tier 2 or higher marine or off-road engine emission standards when they become OCS sources. If crew and supply vessels (e.g. crew transfer vessels) become OCS sources by tethering to an OCS source (e.g. WTGs or ESPs), these vessels would be subject to CCR § 93118.5(e). No vessels that become OCS sources due to anchoring (e.g. cable-laying vessels) are anticipated to meet the definition of "tugboat," "towboat," "crew and supply vessel," "barge," and "dredge" and therefore, would not be subject to the requirement to have Tier 2 or higher engines.

4 APPLICABLE REQUIREMENTS

Section 5 of the OCS Air Permit Application contains an extensive discussion of applicable federal and state regulatory requirements. Relevant state and federal regulations were reviewed, along with other OCS permits to determine applicable requirements for each emissions unit.

Table 2 presents a summary of applicable requirements and emission limits for the Project's OCS sources (see also Section 7 of the OCS Air Permit Application). Emission limits for the Project's marine diesel engines that become OCS sources are presented as the use of certain tier engines; specific maximum hourly emission rates are not provided for marine engines because the exact size and model year these engines will not be known until shortly before (and possibly even after) O&M begins. These emission limits are based on the LAER and BACT analyses in Sections 6.2 and 6.3 of the OCS Air Permit Application and are equivalent to New Sources Performance Standards and National Emission Standards for Hazardous Air Pollutants.

Table 2: Operational and/or Production Emission Limits and Restrictions

EU	Fuel/Raw Material	Pollutant	Emissions Limits/Standards	Operational and/or Production Limits	Applicable Regulation and/or Approval No
1	Marine Distillate Fuel/Marine Residual Fuel	NOx	Use of Tier II (or better) certified engines	• Use of ULSD (S ≤ 15 ppm) where permitted and 1,000 ppm S fuel in all other vessels • Compliance with IMO's energy-efficiency regulations	OCS Air Permit
		VOC			
		PM			
		CO			
		SO2/ H2SO4	See operational limits		
		CO2e			
2	Marine Distillate Fuel/Marine Residual Fuel	NOx	Use of Tier II (or better) certified engines	• Use of ULSD (S ≤ 15 ppm) where permitted and 1,000 ppm S fuel in all other vessels • Compliance with IMO's energy-efficiency regulations	OCS Air Permit
		VOC			
		PM			
		CO			
		SO2/ H2SO4	See operational limits		
		CO2e			
3	Distillate Fuel	NOx	5.6 g/HP-hr NOx + NMHC (7.5 g/kW-h NOx + NMHC)	• Operation restricted to 100 hours per year (outside of emergencies) for reliability testing • Use of ULSD (S ≤ 15 ppm)	OCS Air Permit
		VOC	see combined NOx + NMHC emission limit		
		PM	0.6 g/HP-hr PM (0.8 g/kW-h PM)		

EU	Fuel/Raw Material	Pollutant	Emissions Limits/Standards	Operational and/or Production Limits	Applicable Regulation and/or Approval No
		CO	6.0 g/HP-hr CO (8.0 g/kW-h CO)	• Use of clean fuels and efficient operation	
		SO2/ H2SO4	See operational limits		
		CO2e			
4	Distillate Fuel	NOx	3.5 g/HP-hr NOx + NMHC (4.7 g/kW-h NOx + NMHC)	• Operation restricted to 100 hours per year (outside of emergencies) for reliability testing • Use of ULSD (S ≤ 15 ppm) • Use of DPF • Use of clean fuels and efficient operation	OCS Air Permit
		VOC	see combined NOx + NMHC emission limit		
		PM	0.3 g/HP-hr PM (0.4 g/kW-h PM)		
		CO	3.7 g/HP-hr CO (5.0 g/kW-h CO)		
		SO2/ H2SO4	See operational limits		
		CO2e			
5	Distillate Fuel	NOx	3.0 g/HP-hr NOx + NMHC (4.0 g/kW-h NOx + NMHC)	• Operation restricted to 100 hours per year (outside of emergencies) for reliability testing • Use of ULSD (S ≤ 15 ppm) • Use of DPF • Use of clean fuels and efficient operation	OCS Air Permit
		VOC	see combined NOx + NMHC emission limit		
		PM	0.15 g/HP-hr PM (0.2 g/kW-h PM)		
		CO	2.6 g/HP-hr CO (3.5 g/kW-h CO)		
		SO2/ H2SO4	See operational limits		
		CO2e			
6	Distillate Fuel	NOx	2.6 g/HP-hr NOx (3.5 g/kW-h NOx)	• Operation restricted to 500 hours per year during O&M • Use of ULSD (S ≤ 15 ppm) • Use of clean fuels and efficient operation	OCS Air Permit
		VOC	0.14 g/HP-hr NMHC (0.19 g/kW-h NMHC)		
		PM	0.03 g/HP-hr PM (0.04 g/kW-h PM)		
		CO	2.6 g/HP-hr CO (3.5 g/kW-h CO)		
		SO2/ H2SO4	See operational limits		
		CO2e			

EU	Fuel/Raw Material	Pollutant	Emissions Limits/Standards	Operational and/or Production Limits	Applicable Regulation and/or Approval No
Facility-wide	All	NOx	Annual NOx emissions limit in tpy during O&M based on the Project's final estimate of potential emissions	N/A	OCS Air Permit
Facility-wide	All	VOC	Annual VOC emissions limit in tpy during O&M based on the Project's final estimate of potential emissions	N/A	OCS Air Permit
Facility-wide	All	SO2/ H2SO4	See operational limits	All non-road construction equipment, emergency generators, and smaller marine engines that are subject to the OCS Air Permit will use ULSD with a sulfur content no greater than 15 ppm, where permitted by SOLAS requirements and where such fuel is commercially available. All other marine engines will use fuel with a sulfur content limit of 1,000 ppm.	OCS Air Permit

Table 2 Key:

CO = Carbon Monoxide
CO2e = Carbon Dioxide Equivalent
DPF = Diesel Particulate Filter
EU = Emission Unit
g/HP-hr = Grams per Horsepower Hour
g/kW-hr = Grams per Kilowatt Hour
H2SO4 = Sulfuric Acid Mist
IMO = International Maritime Organization
NMHC = Non-methane Hydrocarbons
NOx = Nitrogen Oxides
N/A = Not Applicable
OCS = Outer Continental Shelf
O&M = Operations and Maintenance
PM = Total Particulate Matter
ppm = Parts per Million
S = Sulfur
SOLAS = Safety of Life at Sea
SO2 = Sulfur Dioxide
tpy = tons per consecutive12-month period
ULSD = Ultra low sulfur diesel
VOC = Volatile Organic Compounds
+ = and
≤ = less than or equal

5 COMPLIANCE WITH 310 CMR 7.00 APPENDIX C APPLICATION REQUIREMENTS

The following section demonstrates that the OCS Air Permit Application in conjunction with this supplemental document fulfills the operating permit application requirements contained in 310 CMR 7.00, Appendix C. Each provision of the general application requirements found at 310 CMR 7.00, Appendix C(5) is restated in *boxes* below, followed by the information necessary to demonstrate that the regulatory requirements have been satisfied.

(*5) General Application Requirements.*

(a) Applications for an operating permit or renewal of an operating permit pursuant to 310 CMR 7.00: Appendix C, and any additional information required by the Department shall be submitted to the Department and EPA in a format prescribed by the Department. An applicant may not omit information needed to determine whether the facility is subject to any applicable requirement.

1. For any subject facility whose emissions exceed the thresholds of 310 CMR 7.00: Appendix C(2)(a)1., the application shall include all applicable requirements for all emissions units.

2. For any facility that contains an emission unit that causes the facility to be subject to 310 CMR 7.00: Appendix C(2)(b), the application shall include all applicable requirements for the emissions units that cause the facility to be subject to 310 CMR 7.00: Appendix C.

During the operational period, the Vineyard Wind Project has federal potential emissions of NOx in the aggregate (including from exempt and insignificant activities) exceeding 50 tons per year. This includes vessels servicing or associated with OCS sources, per 40 CFR Part 55. Therefore, the Project emissions exceed the thresholds of 310 CMR 7.00 Appendix C(2)(a)1. As such, this application for a combined permit to construct and operate under the OCS Air Regulations includes all applicable requirements for all OCS sources.

(b) Except as provided for in 310 CMR 7.00: Appendix C(5)(a)2. and (i), the following information must be submitted for each emission unit associated with the facility. Fugitive emissions shall be included in the permit application in the same manner as stack emissions, regardless of whether the source category in question is included in the list of sources contained in the definition of major source. Applications shall contain at a minimum:

1. Identifying information, including company name and address (or plant name and address if different from the company name); owner's name and telephone number; and name(s) and telephone number(s) of facility site manager/contact.

See Section 2.

2. A description of the facility's processes and products (by Standard Industrial Classification Code) associated with each alternate scenario proposed in the application.

See Section 2.

3. Except for insignificant activities listed in 310 CMR 7.00: Appendix C(5) the following emissions-related information:

a. All emissions of regulated air pollutants for which the emissions unit has an applicable requirement.

Section 4.6 of the OCS Air Permit Application provides an estimate of the Project's potential air emissions during the Project's operational period.

Section 5.1 of the OCS Air Permit Application describes the applicability of federal regulations to the Project. Section 5.2 of the OCS Air Permit Application describes the applicability of Massachusetts' regulations that have been incorporated by reference into EPA's OCS Air Regulations (40 CFR § 55). In particular, the applicability of 310 CMR 7.00, Appendix C to the Project is described in Section 5.2.3 of the OCS Air Permit Application.

b. Identification and description of all points of emissions described in 310 CMR 7.00: Appendix C(5)(b)3.a. in sufficient detail to establish said applicable requirements.

The Project's emission sources during the operational period are described in Section 4.1 and 4.3.2 of the OCS Air Permit Application.

c. Emissions rates in tons per year and in such terms as are necessary to establish compliance consistent with the applicable EPA standard reference emissions test method.

Regarding emission rates in tons per year, Table 4.6-2 of the OCS Air Permit Application provides an estimate of the Project's federal potential to emit (PTE) during the Project's operational period in tons per year. This estimate includes sources that are not OCS sources (OCS sources are listed in Table 1). That is because (as described in Section 4.2 of the OCS Air Permit Application), the definition of potential emissions in the OCS Air Regulations includes emissions from vessels servicing or associated with OCS sources. Thus, the Project's PTE includes emissions from vessels at or traveling to and from an OCS source when within 25 miles of the OCS source, even though the definition of PTE provided in 310 CMR 7.00 does not include emissions from mobile sources.

Regarding emission rates in terms necessary to establish compliance, as described in Section 7 of the OCS Air Permit Application, based on guidance in the New Source Review Manual, emission limits should be "enforceable as a practical matter." Emission limits for the Project's marine compression-ignition engines that become OCS sources (EUs 1 and 2) are presented as the use of certain tier engines in Table 2. Specific emission rates in tons per year are not provided for marine engines because the exact size and model year these engines will not be known until shortly O&M begins.

This is a unique situation in that LAER and BACT is being applied to vessels that are supplied by third-party vendors. Further, through the "Envelope" concept described in Section 2.2 of the OCS Air Permit Application, Vineyard Wind is defining and bracketing Project characteristics for environmental review while maintaining a reasonable degree of flexibility regarding final design and O&M logistics. As such, Vineyard Wind is not able to identify the specific individual marine diesel engines that will be the OCS sources subject to LAER and BACT. Refer to the LAER and BACT analyses for marine compression-ignition engines in Sections 6.2 and 6.3.3 of the OCS Air Permit Application, respectively, for further explanation of the feasibility of emission limitations for the Project's marine engines.

Maximum hourly emission rates for OCS sources that are typically defined as stationary sources (EUs 3 through 7) are provided in Table 2 in terms of g/HP-hr (g/kW-hr). However, as described above, certain engine sizes and other Project details may change after the submission of this application. Compliance with these emission limits will be demonstrated through use of approved Tier-engines. Emissions compliance is demonstrated by the manufacturer on a fleet-wide average basis.

> *d. The following information to the extent it is needed to determine or regulate emissions: fuels, fuel use, raw materials, production rates, and operating schedules.*

The fuel usage and durations of activities for emission sources itemized in Appendix B of the OCS Air Permit Application reflect most current Project design to the best of Vineyard Wind's knowledge at the time of submission, but because Vineyard Wind is still selecting contractors and finalizing the design its facilities, certain engine sizes and other Project details may change after the submission of this application. Vineyard Wind will not know exactly which third-party engines will be used until much closer to the start of O&M because operational and repair plans change on short notice and are highly weather-dependent, the market demand for vessels is huge, and the Jones Act imposes limitations on available vessels. For these reasons, vessels may also be changed out after the operational period begins. However, sufficient information has been provided to determine or regulate emissions from the Project.

> *e. Identification and description of air pollution control equipment and compliance monitoring devices or activities*

Air pollution control equipment required to meet BACT and LAER are described in Sections 6.2 and 6.3 of the OCS Air Permit Application. See Section 7.4 of the OCS Air Permit Application for a discussion of compliance monitoring activities.

> *f. Limitations on source operation affecting emissions or any work practice standards, where applicable, for all regulated pollutants at the source.*

See the summary of applicable requirements (Table 2).

g. Other information required by any applicable requirement (including information related to stack height limitations developed pursuant to 42 U.S.C. 7401, The Clean Air Act, § 123).

See the summary of applicable requirements (Table 2) as well as Section 7 of the OCS Air Permit Application.

h. Calculations on which the information in 310 CMR 7.00: Appendix C(5)(b)3.a. through g. is based.

See Appendix B of the OCS Air Permit Application.

4. For activities proposed to be exempt pursuant to 310 CMR 7.00: Appendix C(5)(h), a list describing each activity and its emissions.

None of the Project's OCS sources listed in Table 1 are considered exempt activities in accordance with the criteria contained in 310 CMR 7.00: Appendix C(5)(h). See the discussion following 310 CMR 7.00: Appendix C(5)(h).

5. The following air pollution control requirements:

a. Citation and description of all applicable requirements, and

See Section 5 of the OCS Air Permit Application.

b. Description of or reference to any applicable test method for determining compliance with each applicable requirement.

See Section 7.4 of the OCS Air Permit Application.

6. Other specific information that may be necessary to implement and enforce 310 CMR 7.00: Appendix C(5)(b)2, (7) or other applicable requirements of 42 U.S.C. 7401 or to determine the applicability of such requirements including but not limited to terms and conditions for reasonably anticipated operating scenarios including:

a. Establishing and maintaining, contemporaneously with making a change from one operating scenario to another, a record in a log at the facility as to which scenario it is operating under; and

b. Documenting that the terms and conditions of each such alternative scenario meet all applicable requirements and the requirements of 310 CMR 7.00: Appendix C. The permit shield described in 310 CMR 7.00: Appendix C(12) shall apply to all terms and conditions under each such operating scenario.

During O&M, most activities will be related to scheduled and preventative maintenance, although some unscheduled corrective maintenance is anticipated. Specific maintenance schedules, which set forth the frequency with which maintenance is to be carried out, will be developed for the scheduled maintenance of each primary component (WTG, ESP, onshore substation, etc.). Vineyard Wind has proposed an annual NOx and VOC emissions limit during the operational period. The Project may operate under various scenarios in accordance with these limitations.

7. An explanation of any proposed exemptions from otherwise applicable requirements.

None of the Project's OCS sources listed in Table 1 are considered exempt activities in accordance with the criteria contained in 310 CMR 7.00: Appendix C(5)(h). See the discussion following 310 CMR 7.00: Appendix C(5)(h).

8. A Compliance Plan that contains all the following:

a. A description of the compliance status of the facility with respect to all applicable requirements.

This requirement does not apply because the Project's facilities have not been constructed.

b. A description as follows:

(i) For applicable requirements with which the facility is in compliance, a statement that the source will continue to comply with such requirements.

See Section 6.

(ii) For applicable requirements that will become effective during the permit term, a statement that the facility will meet such requirements on a timely basis.

See Section 6.

(iii) For requirements for which the source is not in compliance at the time of permit issuance, a narrative description of how the source will achieve compliance with such requirements.

This requirement does not apply because the Project's facilities have not been constructed.

c. A compliance schedule as follows:

(i) For applicable requirements with which the source is in compliance, a statement that the source will continue to comply with such requirements.

See Section 6.

(ii) For applicable requirements that will become effective during the permit term, a statement that the source will meet such requirements on a timely basis. A statement that the source will meet in a timely manner applicable requirements that become effective during the permit term shall satisfy this provision, unless a more detailed schedule is expressly required by the applicable requirement.

See Section 6.

(iii) A schedule of compliance for emissions units that are not in compliance with all applicable requirements at the time of permit issuance. Such a schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with any applicable requirements for which the facility will be in noncompliance at the time of permit issuance. This compliance schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the facility is subject. Any such schedule of compliance shall be supplemental to, and shall not sanction noncompliance with, the applicable requirements on which it is based.

This requirement does not apply because the Project's facilities have not been constructed.

d. A schedule for submission of certified progress reports no less frequently than every six months for sources required to have a schedule of compliance to remedy a violation.

This requirement does not apply because the Project's facilities have not been constructed.

e. The compliance plan content requirements specified in 310 CMR 7.00: Appendix C(5)(b)8.e. shall apply and be included in the acid rain portion of a compliance plan for an affected source, except as specifically superseded by regulations promulgated under 42 U.S.C. 7401, Title IV with regard to the schedule and method(s) the source will use to achieve compliance with the acid rain emissions limitations.

This requirement does not apply to the Project because the Project is not subject to the Acid Rain Program under 40 CFR Parts 72 and 75.

9. Requirements for Compliance Certification, including the following:

a. A certification of compliance with all applicable requirements by a responsible official consistent with 310 CMR 7.00: Appendix C(5)(b)9.c. and 42 U.S.C. 7401, § 114(a)(3);

See Section 6.

b. A statement of methods used for determining compliance, including a description of monitoring, record keeping, and reporting requirements and test methods;

See section 7.4 of the OCS Air Permit Application.

c. A schedule for submission of compliance certifications during the permit term, to be submitted no less frequently than annually, or more frequently if specified by the underlying applicable requirement or by the Department;

Vineyard Wind will follow the compliance certification schedule in the operating permit issued by EPA.

d. A statement indicating the facility's compliance status with any applicable enhanced monitoring and compliance certification requirements of 42 U.S.C. 7401; and

This requirement does not apply because the Project's facilities have not been constructed.

e. A statement accepting the Department's authority to enter the premises of the permitted facility and perform reasonable inspections and sampling, as described in 310 CMR 7.00: Appendix C(3)(g).

See Section 6.

10. The use of nationally-standardized forms for acid rain portions of permit application(s) and compliance plan(s), as required by regulations promulgated under 42 U.S.C. 7401, Title IV.

This requirement does not apply to the Project because the Project is not subject to the Acid Rain Program under 40 CFR Parts 72 and 75.

(c) Any application form, report, or compliance certification submitted pursuant to 310 CMR 7.00: Appendix C shall contain certification by a responsible official of truth, accuracy, and completeness in accordance with 310 CMR 7.01(2).

See Section 6 for a certification by a responsible official in accordance with 310 CMR 7.01(2) for this operating permit. Any future form, report, or compliance certification submitted pursuant to 310 CMR 7.00: Appendix C will contain certification by a responsible official.

(d) Any application for an initial, or renewal of an operating permit submitted to the Department pursuant to 310 CMR 7.00: Appendix C shall include the following:

1. For initial operating permits, copies of any preconstruction, substantial reconstruction or alteration approvals issued by the Department under 310 CMR 7.02;

2. For renewals of operating permits, the last complete operating permit application supplemented with all new information pertinent to the provisions of 310 CMR 7.00: Appendix C(5), (6) and (7), including any operational changes made pursuant to operational flexibility section, and any other proposed operational scenarios.

This operating permit application is being submitted concurrent with the OCS Air Permit Application, which satisfies the plan approval application requirements at 310 CMR 7.02.

(e) Any person who fails to submit any relevant facts or who has submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application but prior to release of a draft permit.

Vineyard Wind will comply with 310 CMR 7.00, Appendix C(5)(e).

Regarding additional information, the Project is being developed and permitted using an "Envelope" concept. The evolution of offshore wind technology toward less expensive, safer, and more efficient concepts often outpaces the speed of permitting processes. The Envelope concept allows Vineyard Wind to properly define and bracket Project characteristics for the purposes of environmental review and permitting while maintaining a reasonable degree of flexibility with respect to the selection and purchase of key Project components, such as the WTGs, foundations, submarine cables, offshore substations, etc. As BOEM recognized in its National Offshore Wind Strategy, the envelope concept allows for optimized projects once permitting is complete while ensuring a comprehensive review of the project by regulators and stakeholders. As the Project is bidding into competitive power procurement processes, this flexible approach is particularly important to ensure the Project can take advantage of rapidly advancing technology and produce the most cost-effective results for Massachusetts ratepayers

The emission estimates contained in the OCS Air Permit Application are based on the Project's maximum design scenario. This general conservatism, combined with other conservative assumptions layered in the calculation process described in Appendix B of the OCS Air Permit Application, is consistent with the "Envelope" concept and allows for a demonstration of compliance with the applicable standards. Final operation and maintenance activities may differ as the Project is optimized.

(f) If any person fails to submit information requested by the Department within the deadlines provided, the Department may deny the application, and an application shield pursuant to 310 CMR 7.00: Appendix C(11) shall automatically terminate pursuant to 310 CMR 7.00: Appendix C(11)(f). Prior to denying the application, the Department shall provide 30 days written notice to the applicant, including a list of the required information. A person may reapply at any time after the application is denied. The re-application shall meet all requirements of a complete initial permit application, including any application fee.

Although 310 CMR 7.00, Appendix C(5)(f) applies to the Project generally, it imposes no specific requirements on the Project.

(g) In the event that a discrepancy exists between the information in an application for an operating permit and the requirements of the permit, the conditions of the permit shall prevail.

Vineyard Wind will comply with the requirements of the OCS Air Permit issued by EPA.

(h) Exempt Activities. Except as provided in 310 CMR 7.00: Appendix C(5)(i), any facility subject to the requirements of 310 CMR 7.00: Appendix C may propose to exempt certain activities from the requirements of 310 CMR 7.00: Appendix C(5)(b). A list of proposed exemptions must be submitted as part of the application. The Department will exempt the emission unit(s) if it is of a size eligible to comply with 310 CMR 7.02(8)(i) or to be exempt from preconstruction review and approval pursuant to 310 CMR 7.02(2)(b)7., 15., or 29. and not otherwise subject to an applicable requirement.

None of the Project's OCS sources listed in Table 1 are considered exempt activities in accordance with the criteria contained in 310 CMR 7.00: Appendix C(5)(h). Exempt activities are those Emission Units of a size eligible to comply with 310 CMR 7.02(8)(i) or to be exempt from preconstruction review and approval pursuant to 310 CMR 7.02(2)(b)7., 310 CMR 7.02(2)(b)15., or 310 CMR 7.02(2)(b)29. as of the construction date, and not otherwise subject to an applicable requirement. All OCS sources are subject to applicable requirements as defined in 310 CMR 7.00, Appendix C(1).

(i) Insignificant Activities. Notwithstanding 310 CMR 7.00: Appendix C(5)(h) any emission unit that is part of the following activities is exempt from the requirements of 310 CMR 7.00: Appendix C, except that emissions from these activities shall be included in determining federal potential to emit under 310 CMR 7.00: Appendix C(2):

Table 3 indicates whether or not the following Insignificant activities listed in 310 CMR 7.00, Appendix C(5)(i) are conducted as part of the Project.

Table 3: Insignificant Activities Under 310 CMR 7.00 Appendix C (5)(i)

Insignificant Activities	Performed
1) Open burning conducted in accordance with the requirements of 310 CMR 7.07(2), (3)(a) and (3)(e)	No
2) Office activities and the equipment and implements used therein, such as typewriters, printers, and pens	Yes
3) Interior maintenance activities and the equipment and supplies used therein, such as janitorial cleaning products and air fresheners; this does not include any cleaning of production equipment or activities regulated by 310 CMR 7.18	Yes
4) Bathroom and locker room ventilation and maintenance	Yes
5) Copying and duplication activities for internal use and for support of office activities at the facility	Yes

Insignificant Activities	Performed
6) The activities not regulated by 310 CMR 7.18 in maintenance shops, such as welding, gluing, soldering	Yes
7) First aid or emergency medical care provided at the facility, including related activities such as sterilization and medicine preparation	Yes
8) Laundry operations that service uniforms or other clothing used at the facility that are not regulated by 310 CMR 7.18	Yes
9) Architectural maintenance activities conducted to take care of the buildings and structures at the facility, including repainting, reroofing, and sandblasting	Yes
10) Exterior maintenance activities conducted to take care of the grounds of the facility, including parking lots and lawn maintenance	No
11) Food preparation to service facility cafeterias and dining rooms	Yes
12) The use of portable space heaters which reasonably can be carried and relocated by an employee	Not expected
13) Liquid petroleum gas (LPG) or petroleum fuels used to power the facility's mobile equipment and not otherwise regulated by the Department	Not expected
14) Emergency vents not subject to the accidental release regulations	Not expected
15) Non-process related surface coating and painting which exclusively use nonrefillable aerosol cans	Yes
16) Vacuum cleaning systems used exclusively for commercial or residential housekeeping	Yes
17) Ventilating systems used exclusively for heating and cooling buildings, for the comfort of people living or working within the building serviced by said system, which EPA has determined need not be contained in an operating permit	Yes
18) Ventilating and exhaust systems for laboratories, including hoods, used: a. by academic institutions for academic purposes. b. by hospitals and medical care facilities used for medical care purposes and medical research only	No
19) Surface coating and printing processes used exclusively for educational purposes in educational institution excluding those emission units regulated by 310 CMR 7.18	No
20) Kilns or ventilating hoods for art or ceramic curricula at colleges, primary or secondary schools.	No

6 COMPLIANCE CERTIFICIATION

The Responsible Official for this Operating Permit is:

Erich Stephens
Chief Development Officer
508-717-8964
estephens@vineyardwind.com

The following statements must be signed by a responsible official:

Pursuant to 310 CMR 7.00: Appendix C(5)(b)(9)(e), "I hereby accept the Department's authority to enter the premises of the permitted facility and perform reasonable inspections and sampling, as described in 310 CMR 7.00: Appendix C(3)(g)."

Erich Stephens
Name of Official

DocuSigned by:
CD11D0E41BEA423...
Signature

4/17/2019
Date

Pursuant to 310 CMR 7.00:Appendix C(S)(b)B.c, I state that "Except for those units identified as not in compliance and for which a schedule is attached, I certify that the facility will continue to comply with all current applicable requirements and will meet the requirements for applicable requirements that will become effective during the term of this permit on a timely basis."

Erich Stephens
Name of Official

DocuSigned by:
CD11D0E41BEA423...
Signature

4/17/2019
Date

Pursuant to 310 CMR 7.01(2)(c) "I certify that I have personally examined the foregoing and am familiar with the information contained in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment."

Erich Stephens
Name of Official

DocuSigned by:
CD11D0E41BEA423...
Signature

4/17/2019
Date